

WHAT IS CLAIMED IS:

1. A control valve for a variable displacement compressor for controlling pressure in a crank chamber
5 formed gastight to thereby change a refrigerant discharge capacity,

characterized in that a plunger of a solenoid is divided into a first plunger and a second plunger, and a pressure-sensing member is disposed between the first
10 plunger and the second plunger, for sensing suction pressure in a suction chamber.

2. The control valve for a variable displacement compressor according to claim 1, wherein the first plunger
15 is disposed between a valve section for controlling pressure within the crank chamber and the pressure-sensing member in a state urged for opening the valve section, and the second plunger is attracted to the first plunger via the pressure-sensing member to form an integral member
20 when the solenoid is energized, and is urged by the suction pressure received by the pressure-receiving member in a direction away from the first plunger when the solenoid is deenergized.

25 3. The control valve for a variable displacement compressor according to claim 2, wherein the pressure-sensing member is a diaphragm.

4. The control valve for a variable displacement compressor according to claim 3, wherein the diaphragm is formed of polyimide film.

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5. The control valve for a variable displacement compressor according to claim 4, wherein the polyimide film is formed by laminating a plurality of pieces of polyimide film.

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6. The control valve for a variable displacement compressor according to claim 2, wherein the pressure-sensing member is a bellows.

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7. The control valve for a variable displacement compressor according to claim 2, wherein the valve section is disposed between first and second ports communicating respectively with a discharge chamber of the variable displacement compressor and the crank chamber.

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8. The control valve for a variable displacement compressor according to claim 7, wherein the valve section includes a valve element disposed such that the valve element can be moved, from a side of the first port, to and away from a valve seat formed in a passage between the first port communicating with the discharge chamber of the variable displacement compressor and the second port

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communicating with the crank chamber, and a shaft disposed between the valve element and the first plunger, for transmitting motion of the first plunger to the valve element.

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9. The control valve for a variable displacement compressor according to claim 7, wherein the valve section includes a valve element disposed such that the valve element can be moved, from a side of the second port, to and away from a valve seat formed in a passage between the first port communicating with the discharge chamber of the variable displacement compressor and the second port communicating with the crank chamber, and a pressure-sensing piston integrally formed with the valve element such that the pressure-sensing piston has an outer diameter substantially equal to an inner diameter of a valve hole forming the valve seat, and that the pressure-sensing piston receives discharge pressure from the discharge chamber, at a pressure-receiving area equal to a pressure-receiving area of the valve element, from a direction opposite to a direction from which the valve element receives the discharge pressure, and receives the suction pressure at an end face thereof toward the solenoid, for transmitting motion of the first plunger to the valve element.

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10. The control valve for a variable displacement

compressor according to claim 1, wherein shock-absorbing means is disposed between the pressure-sensing member and the first plunger.

5 11. The control valve for a variable displacement compressor according to claim 10, wherein the shock-absorbing means includes a disk disposed between the pressure-sensing member and the first plunger, and a spring constantly urging the disk such that the disk is
10 brought into abutment with the pressure-sensing member.

 12. The control valve for a variable displacement compressor according to claim 11, wherein the first plunger and the disk are centered by a sleeve.

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 13. The control valve for a variable displacement compressor according to claim 11, wherein the first plunger is centered by being fixed to a pressure-sensing piston that is integrally formed with a valve element of a
20 valve section that controls pressure in the crank chamber, and held in an axially movably manner, and the disk is centered through fitting of a convex or concave portion formed in a center of the end face thereof opposed to the pressure-sensing member and a concave or convex portion
25 formed in a center of the pressure-sensing member and the second plunger.

14. The control valve for a variable displacement compressor according to claim 1, wherein the first plunger has a side thereof toward a valve section that controls pressure in the crank chamber, fixed to a pressure-sensing piston which is integrally formed with a valve element of the valve section, and axially movably held, and a side thereof toward the pressure-sensing member, held by a C-shaped guide provided therearound.

15. The control valve for a variable displacement compressor according to claim 1, wherein the first plunger is axially movably held by two C-shaped guides provided therearound in a manner axially spaced from each other.

16. The control valve for a variable displacement compressor according to claim 15, wherein the first plunger has a surface thereof for contact with the pressure-sensing member, formed into a tapered shape, to thereby have a reduced flat area opposed to the pressure-sensing member.

17. The control valve for a variable displacement compressor according to claim 7, wherein the valve section includes a valve element disposed such that the valve element can be moved, from a side of the second port, to and away from a valve seat formed in a passage between the first port communicating with the discharge chamber of the

variable displacement compressor and the second port communicating with the crank chamber, and a pressure-sensing piston integrally formed with the valve element such that the pressure-sensing piston has an outer diameter smaller than an inner diameter of a valve hole forming the valve seat, and that the pressure-sensing piston receives discharge pressure from the discharge chamber, at a pressure-receiving area smaller than a pressure-receiving area of the valve element, from a direction opposite to a direction from which the valve element receives the discharge pressure, and receives the suction pressure at an end face thereof toward the solenoid, for transmitting motion of the first plunger to the valve element.

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18. The control valve for a variable displacement compressor according to claim 2, wherein the valve section includes a valve element disposed between a first port and a second port communicating respectively with a discharge chamber of the variable displacement compressor and the crank chamber and between a third port and a fourth port respectively communicating with the crank chamber and the suction chamber such that the valve element can be moved, from a side of the first port, to and away from a valve seat formed in a first passage between the first port and the second port, and a shaft disposed between the valve element and the first plunger for transmitting motion of

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the first plunger to the valve element, the first plunger opening and closing the second passage between the third port and the fourth port.

5 19. The control valve for a variable displacement compressor according to claim 2, wherein the valve section includes a first valve element disposed between a first port and a second port communicating respectively with a discharge chamber of the variable displacement compressor
10 and the crank chamber and between a third port and a fourth port respectively communicating with the crank chamber and the suction chamber such that the first valve element can be moved, from a side of the second port, to and away from a valve seat formed in a first passage
15 between the first port and the second port, a pressure-sensing piston integrally formed with the first valve element such that the pressure-sensing piston has an outer diameter substantially equal to an inner diameter of a valve hole forming the valve seat, and receives discharge
20 pressure from the discharge chamber, at a pressure-receiving area equal to a pressure-receiving area of the valve element from a direction opposite to a direction from which the valve element receives the discharge pressure, and a second valve element integrally formed
25 with the pressure-sensing piston such that the second valve element opens and closes a second passage between the third port and the fourth port and receives the

suction pressure at an end face thereof toward the solenoid, for transmitting motion of the first plunger to the valve element.

- 5 20. The control valve for a variable displacement compressor according to claim 1, wherein the solenoid includes a spring for urging the second plunger toward the first plunger against the suction pressure received by the pressure-sensing member, and an adjustment screw for
10 adjusting load of the spring.